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Page 1 of 1

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1	WHC-SD-EN-AP-089		0	Description of Work for the 100-FR-3 Groundwater Operable Unit	3	3	1	1

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
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4	1	Cog.Eng. J. W. Roberts	J.W. Roberts	5/16/92	H4-55						
4	1	Cog. Mgr. R. P. Henckel	R P Henckel	5/17/92	H4-55						
4	1	QA G. S. Corrigan	Gary Corrigan	5-7-92	H4-16						
		Safety									
		Env.									

18. J.W. Roberts 5/21/92
Signature of EDT Originator — Date

19. _____ _____
Authorized Representative for Receiving Organization — Date

20. R P Henckel 5/21/92
Cognizant/Project Engineer's Manager — Date

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GROUNDWATER
OPERABLE UNIT

APPROVED FOR PUBLIC RELEASE

6. Author

Name: J. W. ROBERTS

J. W. Roberts
Signature

Organization/Charge Code 81221/PH1AA

7. Abstract

This description of work details the field activities to be conducted for the 100-FR-3 Operable unit and will serve as a field guide for those performing the work.

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9. Impact Level 3Q

10. RELEASE STAMP

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CONTENTS

1.0 SCOPE OF WORK

This description of work details the field activities associated with cable tool drilling of groundwater wells in the 100-FR-3 Operable Unit (Task 6) and will serve as a field guide for those performing the work. It should be used in conjunction with the *Remedial Investigation/Feasibility Study Work Plan for the 100-FR-3 Operable Unit, Hanford Site, Richland, Washington* (DOE/RL 1991) for general investigation strategy and with *Environmental Investigations and Site Characterization Manual* (WHC 1988c) for specific procedures. Well locations are shown on Figure 1.

The coordinates used on Figure 1 are by USGS (1983). All wells on the map are prefixed with a 199, but the prefix has been dropped for clarity.

2.0 GENERAL REQUIREMENTS

2.1 HEALTH AND SAFETY

All personnel working to this description of work will have completed the 40-h Hazardous Waste Site Worker training program and will perform all work in accordance with the following:

- WHC-EP-0383, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan* (WHC 1990)
- WHC-CM-4-10, *Radiation Protection* (WHC 1988d)
- WHC-IP-0692, *Health Physics Procedures Manual* (WHC 1991b)
- WHC-CM-4-11, *ALARA Program* (WHC 1988a)
- WHC-CM-4-3, *Industrial Safety Manual*, Vol. 1 through 3 (WHC 1987)
- WHC-CM-7-5, *Environmental Compliance Manual* (WHC 1988b)
- WHC-CM-7-7, *Environmental Investigations and Site Characterization Manual* (WHC 1988c)
- WHC-SD-EN-SAD-002, Rev 0, *100 Area Low Hazard Characterization Activities Safety Assessment* (Taylor 1991)
- Site-specific health and safety plan/job safety analysis.

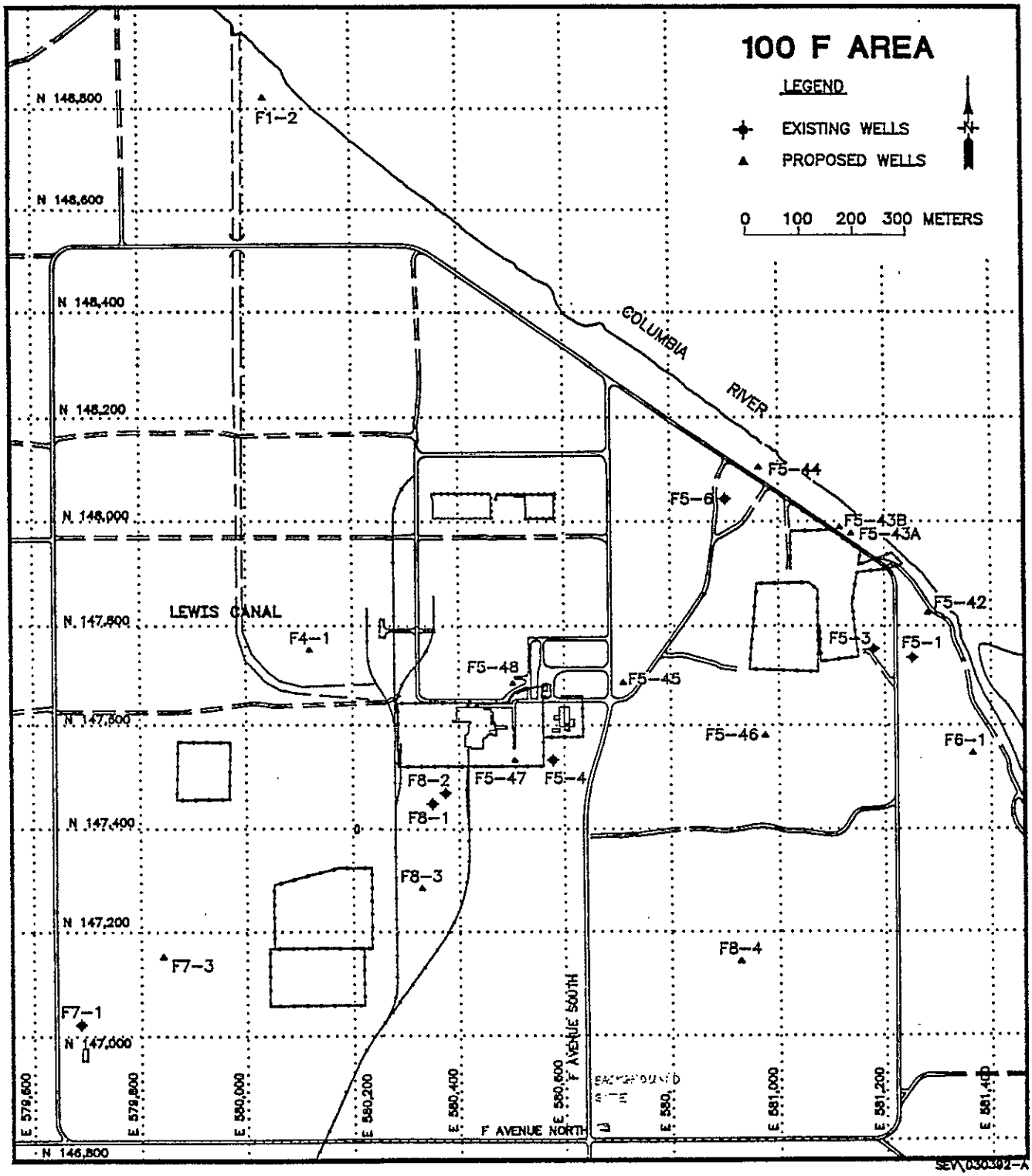

Figure 1. Location of Wells in 100-FR Area.

2.2 PREREQUISITES

Each item on the Drilling Planning Form (EII 6.7, Resource Protection Well and Test Borehole Drilling) (WHC 1988c) will be signed and dated by the cognizant engineer or field team leader prior to the start of work. A readiness review, if required will be conducted according to EII 1.13, Readiness Review (WHC 1988c). In addition, all field work will be conducted in accordance with *Generic Well Specification* (WHC 1991a).

3.0 SAMPLING AND FIELD ACTIVITIES

3.1 SOIL SCREENING

All samples and cuttings will be field screened for evidence of volatile organics and radionuclides (Section 5.1.6.2.3 of the 100-FR-3 work plan) (DOE/RL 1991). Volatiles will be screened by the field geologist using an organic vapor monitor (OVM) that will be used, maintained, and calibrated consistent with EII 3.2, Health and Safety Monitoring Instruments (WHC 1988c) and EII 3.4, Field Screening (WHC 1988c). Radionuclide screening will be performed by the field geologist per EII 3.4, Field Screening (WHC 1988c). The field geologist will record screening results in the borehole log (EII 9.1, Geologic Logging) (WHC 1988c).

The action level for radionuclide screening is twice background. The action level for volatile organic screening is 5 ppm above background. Prior to initiating drilling, determine a one time instrument background reading using the above instruments at the background site located on Figure 1. Instrument background will be measured on freshly disturbed surface soil, holding the instruments less than 1 in. from the soil. The field geologist will record the background levels in the borehole log per EII 9.1, Geologic Logging (WHC 1988c) prior to the start of drilling.

3.2 GEOLOGIC SAMPLING

Geologic samples will be taken at 5-ft intervals for each hole and at major stratigraphic changes for the preparation of borehole logs, per Section 5.1.6.2.3 of the 100-FR-3 work plan (DOE/RL 1991) and EII 9.1, Geologic Logging (WHC 1988c). The field geologist shall archive the nonradioactive geologic samples per EII 5.7A, Hanford Geotechnical Sample Library Control (WHC 1988c).

At the completion of each groundwater well two composite samples will be collected (from unsaturated sediments): one from archive samples in the top half of the well and one from archive samples in the bottom half. An equal volume will be taken from each archive sample, composited in a stainless steel bowl, and placed in a 500-ml glass bottle. Each composite sample will be analyzed for Gamma Spec only, as a check on the radiation detection instrument. Results will be recorded in the borehole log.

All waste generated during drilling activities will be handled according to EII 4.2, Interim Control of Unknown, Suspected Hazardous and Mixed Waste (WHC 1988a). (A CERCLA-specific EII is in preparation and will be used in lieu of EII 4.2 when issued.)

3.3 SOIL SAMPLING (PHYSICAL PROPERTY)

Collect four samples for physical property analysis per Section 5.1.5.3 of DOE/RL (1991) and EII 5.2, Appendix B, Soil and Sediment Sampling (WHC 1988c) from each of the following wells: 199-F5-43B, 199-F5-48, and 199-F7-3. Samples that do not meet the physical properties testing lab radiological acceptance criteria (anything > background) will not be collected for physical property testing. Alternate wells will be 199-F5-43A, 199-F5-47, and 199-F8-3.

The goal for selecting physical property samples is to collect two samples between the ground surface and the capillary fringe, (one near the surface and one between the surface and capillary fringe), one at the capillary fringe, and one within the saturated zone. The field geologist must use professional judgement to select samples that are representative of the principle soil types that can be sampled with the split-spoon sampler. One 6-in. sleeve, one moisture tin, and one bag (approximately 10 lb) will be collected. The field geologist will record the selected samples in the borehole log per EII 9.1, Geologic Logging (WHC 1988c).

These samples will be analyzed for the following parameters using American Society for Testing and Materials (ASTM) methods. Bulk density will be calculated. K_{unsat} will be both measured and calculated, for comparative purposes.

- Bulk density
- Particle Size Distribution (ASTM D422-63)
- Moisture Content (ASTM D2216)
- Moisture Retention (ASTM D2325-68, D3152-72)
- Saturated Hydraulic Conductivity (K_{sat}) (ASTM D2434-68)
- Unsaturated Hydraulic Conductivity (K_{unsat}) at 10% moisture content after full saturation.

Data collected from these analyses will be stored in the 100-FR-3 project files.

3.4 ANALYTICAL SAMPLING

3.4.1 Soil

Collect analytical soil samples in all wells except those listed below per Section 5.1.6.2.3 of the 100-FR-3 work plan (DOE/RL 1991) and EII 5.2, Appendix B, Soil and Sediment Sampling (WHC 1988c). Collect these at 10 ft above the expected groundwater, one 5 ft above and one 5 ft below the groundwater. In addition, if screening values (including borehole cuttings and geologic samples) exceed screening action levels, collect analytical samples with a split-spoon sampler at 5-ft intervals until either: 1) two

consecutive screening values fall below the screening action limits outlined above or 2) until 5 ft below groundwater.

Unless screening action levels are exceeded, only one analytical soil sample will be taken in well 199-F5-43B, at the bottom of the unconfined aquifer. If additional samples are required, they will be collected by the screening criteria described above and recorded in the borehole log (EII 9.1, Geologic Logging) (WHC 1988c).

Prior to drilling into the confined aquifer, the integrity of the well seal will be tested according to the test plan written for 300-FF-5 (EMO-1029, AD-940).

Estimated depths, screened intervals, and samples to be taken are shown on Table 1.

Table 1. Well Depths and Sampling Information.

Well number	Est. depth (ft)	Design type	Est. screened interval (ft)	Physical prop. samples
199-F6-1	60	shallow	55 - 75	no
199-F5-42	45	shallow	40 - 60	no
199-F5-43A	45	shallow	40 - 60	no
199-F5-43B	300	deep	290 - 300	yes (4)
199-F5-44	45	shallow	40 - 60	no
199-F5-45	42	shallow	37 - 57	no
199-F5-46	40	shallow	35 - 55	no
199-F5-47	60	shallow	55 - 75	no
199-F5-48	60	shallow	55 - 75	yes (4)
199-F8-3	48	shallow	43 - 63	no
199-F4-1	45	shallow	40 - 60	no
199-F1-2	60	shallow	55 - 75	no
199-F7-3	34	shallow	29 - 49	yes (4)
199-F8-4	54	shallow	49 - 69	no

3.4.2 Groundwater

Groundwater samples will be collected from each well per EII 5.8 Groundwater Sampling (WHC 1988c) and analyzed for the full suite of parameters listed below for the first two rounds of sampling (Section 5.1.6.3 of the 100-FR-3 work plan) (DOE/RL 1991).

3.4.3 Analyses

Samples collected for chemical analysis will be analyzed for the full suite of CERCLA Contract Laboratory Program (CLP) Target Compound List (TCL) and Target Analyte List (TAL) constituents, specific anions that may be present, and for radionuclides. Estimated quantity of material needed for analyses are shown in Tables 1 and 2. The laboratory will use existing Level IV CLP methods and methods approved under their contract for radiological analyses (Level V). Sample custody will follow procedures as outlined in EII 5.1, Chain of Custody (WHC 1988c).

Table 2. List of Analytes (Soil).

Analyte	Method	Holding Time	Container/Volume
ICP/AA metals	CLP	6 months	G 250 ml
Mercury		28 days	
Cyanide		14 days	
VOA	CLP	14 days	G 125 ml
Semi-VOA	CLP	7 days[1]	aG 1000 ml
PCB's/Pesticides	CLP	7 days[1]	
Anions			
Fluoride	EPA 300.0	28 days	
Nitrate	EPA 353.3	28 days	
Sulfate	EPA 300.0	28 days	
Gross alpha	lab SOP	6 months	G 1000 ml
Gross beta			
Gamma spec.			
Sr-90			
C-14			
U-235, 238			
Pu-239, 240			
Am-241			
Total Activity (222-S Lab)	lab SOP	6 months	G or P small vial (at least 1 gram)

[1] 7 days for extraction, 40 days after analysis for extraction.

AA = atomic absorber
CLP = Contract Laboratory Program
ICP = inductively coupled plasma
PCB = polychlorinated biphenyl
N/A = not applicable
SOP = standard operating procedures
VOA = volatile organic analyses
G = glass
aG = amber glass
P = plastic

Table 3. List of Analytes (Groundwater).

Analyte	Method	Holding Time	Container/Volume
ICP/AA metals Mercury	CLP	6 months 28 days	P 3X1000 ml[2]
Cyanide	CLP	14 days	P 3X1000 ml[2]
VOA	CLP	14 days	Gs 3X40 ml
Semi-VOA PCB's/Pesticides	CLP	7 days[1]	aG 3X2000 ml[2]
Anions F, SO^4 pH Conductivity	EPA 300.0 9040 9050	28 days 28 days	P 1000 ml
NO_3	353.2	28 days	G 500 ml
Gross alpha Gross beta Gamma spec. Sr-90 U-235, 238 Pu-239, 240 Am-241	lab SOP	6 months	P 6000 ml
C-14	lab SOP	6 months	P 500 ml
Tritium	lab SOP	6 months	Gs 250 ml
Tc-99	lab SOP	6 months	P 1000 ml
Total Activity	N/A	6 months	G or P small vial (at least 1 ml

[1] 7 days for extraction, 40 days after analysis for extraction.
[2] 3X is required for QA/QC in the CLP protocol.

AA = atomic absorber
CLP = Contract Laboratory Program
ICP = inductively coupled plasma
PCB = polychlorinated biphenyl
N/A = not applicable
SOP = standard operating procedures
VOA = volatile organic analyses
G = glass
aG = amber glass
P = plastic

If full sample volume requirements cannot be met, the sampling scientist will record the volume obtained in the sampling scientists logbook per EII 1.5, Field Logbooks (WHC 1988c) and analyze in the following order:

1. Volatiles
2. Semivolatiles/PCB's/pesticides
3. Target Analyte List
4. Radioisotopes
5. Anions
6. Total Activity

3.5 GEOPHYSICAL LOGGING

Gross-gamma log all groundwater wells, performing the work in two stages: Stage 1 after completing the first 20 ft of drilling before reducing to a smaller casing. If the gross-gamma tool is not available within 4 h of when needed, skip logging the first 20 ft. Stage 2 after reaching total depth and before completing the well (EII 11.1, Geophysical Logging) (WHC 1988c). Spectral-gamma log groundwater wells only if contamination is indicated by the

gross-gamma log (survey exceeds 100 cps for any depth interval) or by field screening.

3.6 AQUIFER TESTING

Perform a slug test on each well per Section 5.1.6.2.5 of the 100-FR-3 work plan (DOE/RL 1991) and EII 10.1, Aquifer Testing (WHC 1988c).

4.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

Internal quality control samples shall be collected by the sampling scientist as stated below, per Appendix A, Quality Assurance Project Plan (DOE/RL 1991) and documented in the sampling logbook per EII 1.5, Field Logbooks (WHC 1988c). The trip blank and field blank have been deleted for soil sampling per EPA/540/G-87/004 Appendix C, Section C.6.

Groundwater:

1. Collect 1 duplicate for every 10 groundwater samples or a minimum of 1 per reactor area.
2. Collect 1 split sample per reactor area.
3. Collect field blanks at the same frequency as duplicates.
4. Collect 1 (VOA) trip blank per cooler that contains samples that will be analyzed for volatiles. Only analyze for volatiles.
5. Collect equipment blanks at the same frequency as duplicates.

Soil:

1. Collect 1 duplicate for every 20 soil samples.
2. Collect 1 split sample per reactor area.
3. Field blanks are not required.
4. Collect 1 sample each month from any source of water introduced into the hole during drilling. Only 1 sample is required for both groundwater and vadose borings. Analyze for the full suite of water parameters.
5. Collect 1 (VOA) trip blank for each batch of containers shipped to the sampling (site) facility and analyze for volatiles only. The media shall be silica sand.
6. Collect equipment blanks at the same frequency as duplicates and analyze for the constituents listed in Table 2. The media shall be silica sand.

5.0 SCHEDULE

The following schedule is for drilling in the 100-FR-3 operable unit for 1992. This schedule is subject to change and the operable unit coordinator should be contacted for current status. An Agreement Activity Notification form will be issued at least 5 days prior to start of field work.

Well number	Drilling dates
199-F6-1	mid December - late April
199-F5-42	mid December - late April
199-F5-43A	mid December - late April
199-F5-43B	mid December - late April
199-F5-44	mid December - late April
199-F5-46	mid December - late April
199-F5-45	mid December - late April
199-F5-48	mid December - late April
199-F5-47	mid December - late April
199-F8-3	mid December - late April
199-F4-1	mid December - late April
199-F1-2	mid December - late April
199-F7-3	mid December - late April
199-F8-4	mid December - late April

6.0 CHANGES TO THE DESCRIPTION OF WORK

Major changes to this description of work, such as analyzing different parameters, using different analytical methods, or changing the sampling interval will be submitted on the attached form (Attachment 1) and kept on file with the operable unit coordinator. Copies will be submitted to the lead regulatory agency and appropriate field personnel.

7.0 REFERENCES

DOE/RL 1991, *Remedial Investigation/Feasibility Study Work Plan for the 100-FR-3 Operable Unit, Hanford Site, Richland, Washington*, DOE/RL-90-08, U.S. Department of Energy, Richland Field Office, Richland, Washington.

Taylor, 1991, *100 Area Low Hazard Characterization Activities Safety Assessment*, WHC-SD-EN-SAD-002, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

WHC, 1987, *Industrial Safety Manual*, Vol. 1 through 3, WHC-CM-4-3, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988a, *ALARA Program*, WHC-CM-4-11, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988b, *Environmental Compliance Manual*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988c, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988d, *Radiation Protection*, WHC-CM-4-10, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan*, WHC-EP-0383, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991a, *Generic Well Specification*, WHC-S-014, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991b, *Health Physics Procedures Manual*, WHC-IP-0692, Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

100-FR-3 DESCRIPTION OF WORK PROJECT CHANGE FORM

Date: _____

Person Initiating Change: _____

Change: _____

_____

_____

_____

_____

_____

_____

Reason for Change: _____

_____

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_____

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_____

APPROVAL:

Field Team Leader: _____

Operable Unit Coordinator: _____

Quality Assurance: _____

INFORMATION RELEASE REQUEST

References: WHC-CM-3-4

COMPLETE FOR ALL TYPES OF RELEASE

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- ☐ Brochure/Flier
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- ☐ Controlled Database
- ☐ Other

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CHECKLIST FOR SIGNATORIES

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Information conforms to all applicable requirements. The above information is certified to be correct.

Author/Requestor (Printed/Signature): J. W. Roberts, J. W. Roberts — Date: 3/16/92

Responsible Manager (Printed/Signature): R. P. Henckel, R P Henckel — Date: 3/17/92

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Date Received: 3/18/92

116

BD-7600-062 (4/90) (EF) WEF074
Information Release Request

Part 1

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DISTRIBUTION SHEET

To: R. P. Henckel

From: J. W. Roberts

Date: March 16, 1992

Project Title/Work Order:

DESCRIPTION OF WORK FOR THE 100-FR-3 GROUNDWATER OPERABLE UNIT

EDT No.: 157786

ECN No.:

Name	MSIN	With Attachment	EDT/ECN & Comment	EDT/ECN Only
G. S. Corrigan	H4-16	X		
R. E. Day	H4-55	X		
J. D. Fancher	N3-05	X		
K. A. Gano	X0-21	X		
B. A. Gilkeson	L4-78	X		
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